

FINANCING THE AIRCRAFT PROGRAM

1 April 1946.

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CAPTAIN WORTHINGTON:

Gentlemen, the next lecturer will be from the Air Materiel Command, Wright Field. He is an honor military college graduate and was commissioned in the Reserve Corps in June, 1931, as a second lieutenant in the Coast Artillery Corps Reserve. He has been on active duty since 1941 in the Chicago Ordnance District; the Eastern Base Section, North Africa; the Headquarters 15th Air Force, Italy; and is now at the Headquarters, Air Materiel Command.

He attended the following Army schools: Command & General Staff School, Fort Leavenworth; Bomb Reconnaissance Course, Aberdeen Proving Ground; Property Disposal Course, Headquarters, ATSC; and Contracting Officers Conference, March 1945.

Gentlemen, Major Hartman L. Butler, Jr., who will speak to you now on the subject of Financing the Aircraft Program.

MAJOR BUTLER:

I feel right at home here. When I went on active duty, my first commanding officer was your General Armstrong. When General Armstrong went on duty as a second lieutenant in the Coast Artillery Corps on the eve of World War I, his first commanding officer was my father. I remember in the summer of 1941, while I was still wearing civilian clothes as a lieutenant with the Chicago Ordnance District, there was a young major on duty with us, and we were all greatly impressed because he had just come from the Army Industrial College. So now I feel quite happy to be here talking to you.

Last spring, the AAF was quite concerned about the future financial status of aircraft industry. We made a very intensive study of the industry and projected it into the future to the end of 1946. At that time, in the spring of 1945, it was a lot more difficult to make a projection than it is now, because of the fact that the Contract Termination Act, though in existence, had not really been tested. Actually we had not had the first hurdle, VE-Day, or the second hurdle, VJ-Day.

I notice that you have had a number of distinguished speakers talk about the financial phases of the materiel procurement problems of the Army and Navy. I will attempt not to retrace their steps, but rather to more or less point out the economic and financial highlights of the aircraft manufacturing industry, and more particularly from the point of view of the Army Air Forces.

A bit of historical background seems in order.

The aeronautical industry as it is now is an outgrowth of World War I. In the year 1918 the aircraft industry produced 16,000 planes, with a value

of approximately 250 million dollars. By 1921 the total sales of the aircraft industry was only 7 million dollars, and all companies had either gone bankrupt or through a major financial reorganization. There was steady rise through 1929 to 75 million dollars, and the number of planes produced was 6,000 -- the industry ranked 144th that year. Then there was a tremendous drop through 1932, when total sales were only 32 million dollars.

In 1934 the Baker Board came up with their recommendation for an Air Force of 2,300 planes by 1940. Coincidental with that the Vinson Act came about, authorizing 1200 planes for the Navy. By 1936 sales were back to the 1929 figure of 75 million, and by 1937 the total doubled to 150 million dollars.

Now let us look at the economic and financial characteristics of the aircraft industry. In the first place, none of the aircraft companies has any funded debt. Secondly, their financial structure is very simple, with usually only one class of capital stock.

A third characteristic of the aircraft industry is the varying types of financial organization. On the one hand you have the two very large integrated companies, Curtiss-Wright Corp. and United Aircraft Corp., which are integrated for airframes, propellers, engines, and accessories. Then you have the special manufacturers such as Boeing. Then there is the North American Aviation Company, a military aircraft manufacturer, 30 percent of whose stock is owned by General Motors Corporation. Also you have Consolidated-Vultee, a controlling share of whose stock is owned by the Aviation Corporation, an investment trust which has various interests in the aircraft industry, air transport industry, and related fields.

Fourthly, it is a very highly specialized competitive field, with a limited sales volume. Research and development give an importance to design over production. New companies could enter the field only with great difficulty.

Fifthly, during the decade 1930 to 1939 only a small amount of new capital went into the aircraft industry, the total being something less than 60 million dollars.

That brings us to the status of the aircraft industry at the eve of the war, 1939 to 1941. The total assets at that time were 500 million dollars, most being current assets offset by current liabilities. The net worth was about 150 million, including about 100 million fixed assets and about 40 million of net working capital. At that time aircraft manufacturing ranked 44th in American industries.

For the year 1939 the industry had an aggregate volume of business at a record total of 300 million dollars. At the close of the year the American aircraft industry had on its books in unfilled orders from England and France a total of 600 million dollars. In other words, it had a foreign backlog equal to more than twice its then annual capacity.

A study of the aircraft industry is really a study of a few individual companies. There were about twenty aircraft companies, and these were

dominated by a few -- in 1940 the seven major AAF manufacturers accounted for 93 percent of the total airframe weight of the entire aircraft industry. Of course, the Army Air Forces has no brief for any individual company: The aggregate of resources, skill, experience, and so forth, are of primary concern to the armed forces rather than the identity of any one company.

Now let us pass to the relation of the aircraft industry and the armed forces.

The first point is that the AAF has no manufacturing arsenals. Of course you know that the Ordnance Department has its arsenals, going back to the Revolutionary War. You know the Navy has gigantic shipbuilding yards - also in World War I, the Navy produced some airplane engines and toyed with the idea of making airframes. So in essence, the private - aircraft manufacturing industry is the arsenal of the AAF.

The second point is that current procurement is limited to the companies now in existence. If Ordnance wants to make a tank, they can go to one of their arsenals, or to the automobile industry, or to the farm equipment industry, or to the railway locomotive industry. But if the AAF wants planes, they must go to the then-existing peacetime specialized aircraft manufacturing companies.

In World War II only three companies went into the production of airframes - these were Ford, General Motors, and Goodyear, which incidentally, have always been interested in aircraft. (I understand that the latter has remained in aircraft production, whereas Ford and General Motors are completely out of the airframe business by now). The proof of the pudding is in the eating - thus during the entire war the old-line, peacetime aircraft industry accounted for nine out of every ten airframes produced.

A third point is that the aircraft industry is absolutely dependent upon military orders for its bread and butter, for its very existence. The Navy will always have Bethlehem Steel. Ordnance knows that such companies as General Motors, International Harvester, etc. can keep their facilities operating with civilian orders. Western Electric will be available to the Signal Corps, and Armour to the Quartermaster, as these concerns can always keep busy on civilian business. But if the AAF or the BAR wants planes, it must look to Douglas, Martin, Grumman, and so forth which require in turn Government contracts.

Now let us summarize the expansion and growth of the industry. In 1944 aircraft sales totaled 16 billion dollars. There were employed directly or indirectly 2,100,000 persons. Manufacturing floor space was about 200 million square feet. The industry now ranked number one.

As noted in the year 1937 the sales were 150 million. Now assuming this year as a base of one, we find in 1944 the following approximate indices: airframes weight produced 100; dollar sales, 100; number of employees, 70; number of square feet, 30; number of units produced, 30. That is a relative ranking over the 1937 figures.

Now, let us consider Table I, which shows the relation of peak war sales to prewar capital of the ten largest AAF contractors. We have eliminated several of the smaller companies, such as Fairchild and Northrop, which during the war accounted for only a small part of total, but today are very important contractors. One large company, Grumman, was solely Navy. The ten largest companies for the AAF were Bell, Boeing, Consolidated-Vultee, Curtiss-Wright, Douglas, Lockheed-Vega, Martin, North American, Republic, and United Aircraft. Also by using exactly 10 companies, you can point off one place and get the typical or average company.

This Table shows by ratio the relationship between the capital stock, surplus, and reserves, this being at the end of 1939, and peak war sales in 1944. The aggregate of these ten companies was a capital of 138 million dollars. In 1944 they had aggregate sales of 7 billion 600 million dollars, or a ratio of 55 to 1. In other words, every dollar of invested capital in 1939 was turned over in 1944, 55 times.

TABLE I
PEAK WAR SALES TO PREWAR CAPITAL
TEN LEADING AIRCRAFT MANUFACTURERS

<u>Manufacturers</u>	<u>1939 Net Worth</u>	<u>1944 Sales</u>	<u>Peak War Sales Times Pre-War Capital</u>
Bell	\$2,300,000	\$317,000,000	140-1
Boeing	3,800,000	608,000,000	158-1
Consolidated-Vultee	10,200,000	960,000,000	94-1
Curtiss-Wright	34,700,000	1,717,000,000	50-1
Douglas	13,800,000	1,061,000,000	77-1
Lockheed - Vega	8,400,000	602,000,000	72-1
Martin	18,000,000	533,000,000	30-1
North American	9,600,000	684,000,000	72-1
Republic	5,000,000	370,000,000	74-1
United Aircraft	32,500,000	744,000,000	23-1
TOTAL	<u>\$138,300,000</u>	<u>\$7,596,000,000</u>	<u>55-1</u>

The individual companies show varying ratios. It seems to be that the larger the invested capital at the beginning of the war, the smaller the ratio. You see here that United Aircraft had 33 million - (incidentally, that was before they sold more stock) - its turnover was only 23 times. Curtiss-Wright, with a capital of 35 million, turned theirs over 50 times. Martin, also one of the largest companies, shows a relationship of 30 to 1. The extreme ratio was Boeing - with a capital of about 4 million, its wartime sales were 600 million, or a turnover of 158 times.

Incidentally, this chart shows also the comparative standing on sales. You will see Curtiss-Wright leads with sales of one billion 700 million,

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followed next by Douglas, then by Consolidated-Vultee, then by United Aircraft, and so on down, the lowest being Bell, with 300 million worth of business in 1944.

The problem of financing the aircraft industry was large - that is evident by the tremendous gap between sales and invested capital.

In considering possible methods of financing, there were, of course, the traditional methods of selling additional stock, using own financial resources, going to commercial banks, etc. However, the aircraft industry being a small and speculative industry, didn't have very strong banking connections. It had a relatively small invested capital, and the capital markets in 1938-1942 were in a non-receptive mood for any new financing. So a very small proportion of the total was handled by normal means. Therefore, as the Government was going to buy the planes, the Government had to be the financier.

I am not going to attempt to go into all the types of financing, but will indicate the status of the AAF to total War Department financing. In the aggregate the AAF accounted 38 percent of the total financing by the War Department. From the standpoint of fixed assets the AAF accounted for 86 percent of the Emergency Plant Certificates, 85 percent of the Defense Plant Corporation, and only 8 percent of the War Department-owned. In financing working capital the AAF accounted for 55 percent of the Guaranteed Loans, 55 percent of Advance Payments, and only 15 percent of Direct Loans by the War Department.

There is the famous figure in the report of the Surplus Property Administration of 3 billion 800 million, as the total Government investment in airplane plants. That is an awful lot of money - The net depreciated plant value of the automobile industry was only 1 billion 300 million. - The steel industry in the period 1936 to 1945 invested in new plants a total of only 2 billion 200 million. In other words, the Federal Government dumped into aircraft manufacturing plants a sum in dollar volume equal to more than the peacetime plant value of the automobile industry plus the steel industry plant investment for a 10 year period.

The sponsor of these 3 billion 800 million was 82 percent AAF, 18 percent from the Bureau of Aeronautics. The source was Defense Plant Corporation 83 percent, War Department 9 percent, and Emergency Plant Certificates 8 percent. The type, where this money went: 60 percent into machinery and equipment; 37 percent into land and buildings, and 3 percent into miscellaneous.

In these ten companies the Government invested a total of 1 billion 400 million, whereas the companies themselves put in about 170 million. Note also that much of the balance went into aircraft and engine plants operated by other industries. The overall construction of new aircraft plants accounted for 90 percent, whereas conversion accounted for only 10 percent. In the aircraft engine field, new construction accounted for 75 percent and conversion 25 percent. A study made of 15 aircraft companies shows their plant facilities were expanded tremendously - in 1939 they had 7 million square feet, in 1942 50 million square feet, and in 1944 they had 90 million square feet.

Now let us pass to the working capital phase of financing. Advance payments were very important. However, the advantage of advance payments was, as you know, only applicable to prime contractors. It did not apply to your subcontractors. The total aggregate AAF prime contractor advance payments was 3 billion 775 million.

Then the Government, as you know, passed the necessary legislation and executive orders to guarantee loans, under which the War Department or Navy Department would guarantee to the Federal Reserve Bank commercial loans made to manufacturers. This applied mainly to the subcontractors. The total AAF guaranteed loans were 5 billion 100 million dollars.

Then there was the partial payment method. The cost-plus-fixed-fee contract was very popular with airframe companies, and five did most of their business on the CPEF basis. That meant that as soon as raw material came into the plant, immediately the Government assumed property liability for it. We have the extreme case of Boeing, which in 1944 had 600 million dollars worth of business, whose balance sheet shows only 200 thousand dollars worth of inventory - two hundred thousand worth of inventory on their books to do six hundred million dollars worth of business!

It is obvious that Uncle Sam was really doing the financing through partial payments. CPEF had its advantages to the Government in making a lower profit margin on the end product. But it had its disadvantages too, in contract termination, because in the cases of these biggest aircraft manufacturers with tremendous CPEF contracts, accounting problems made the final termination settlement very complicated.

Reinvested earnings was one method the companies themselves contributed to financing the war-time expansion of aircraft industry, these 10 companies alone having nearly 400 million dollars of earnings after taxes and dividends.

Another method of financing was by maintaining only a nominal current ratio. Of course, the traditional commercial standard is a ratio of current assets to current liabilities of two to one. The aircraft companies during the war "financed" increased inventories and/or accounts receivable by a proportionate increase in current liabilities, owed directly or indirectly to the Government. Thus their current ratio dropped as low as one point one to one. This was a very important way that the aircraft manufacturers were able to handle such a large volume of business on such a small amount of their own funds.

Now let us go in some detail to the other three charts.

Table II shows in millions of dollars the increased working capital for the ten leading airplane manufacturers. Here we have taken the war-time earnings for the five years 1940-1944, that is, total earnings after income taxes and after provision for renegotiation, but before any arbitrary provision for contingency reserve -- their total wartime earnings were 557 million dollars. -

During this period they paid dividends of 166 million dollars - the 10 companies had total net worth in 1939 of 138 million dollars - So the stockholders came out pretty well on the matter of dividends during the war.

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Practically no surplus earnings were invested in fixed plant, as the Government itself was buying additional fixed plant, or else the companies themselves were getting so large a tax credit for amortization that they could throw it back into additional facilities without affecting their working capital position.

The working capital increase in this five-year period is 407 million dollars - that is on the chart entitled "Working Capital Increase 1939-44".

TABLE II
WORKING CAPITAL INCREASE
TEN LEADING AIRCRAFT MANUFACTURERS

<u>Manufacturers</u>	<u>Wartime Earnings 1940-1944</u>	<u>Dividends Paid 1940-1944</u>	<u>Working Capital Increase 1939-1944</u>
Bell	\$13,200,000	\$2,200,000	\$11,700,000
Boeing	39,500,000	5,400,000	34,100,000
Consolidated-Vultee	63,600,000	11,200,000	37,600,000
Curtiss-Wright	114,600,000	41,300,000	93,600,000
Douglas	61,600,000	15,000,000	47,600,000
Lockheed - Vega	53,600,000	10,000,000	27,200,000
Martin	49,700,000	13,800,000	33,400,000
North American	49,300,000	18,000,000	31,000,000
Republic	14,000,000	1,000,000	11,300,000
United Aircraft	97,700,000	47,700,000	79,400,000
TOTAL	\$556,800,000	\$165,600,000	\$406,900,000

Table III shows increased capital funds in million of dollars for the period 1940-44. We see that the earnings to surplus in these five years were 224 million dollars. Now, this "earnings to surplus" figure is earnings after their contingency reserve - practically all the aircraft manufacturers in the war years established very large contingent reserves, most of which were arbitrary. In other words, there are minimum earnings to surplus of 224 million dollars.

We see here that only four of the 10 companies in this period 1940-1944 went into the capital market for additional money. The total of 39 million dollars is only a nominal sum in relation to war-time business. Incidentally, most of this came from the 25 million dollars of preferred stock issued by United Aircraft when the company was expanding for foreign orders.

Capital stock and surplus of the 10 companies increased from their 1939 to 1944 balance sheets, by a total of 243 million dollars. In 1939 the reserve for contingencies was a very nominal figure, but the total increase by 1944 was 183 million dollars. The sum of these two increases is 426 million dollars for capital stock, surplus, and reserves.

TABLE III

INCREASED CAPITAL FUNDS

TEN LEADING AIRCRAFT MANUFACTURERS

1940 - 1944

Manufacturers	Earnings to Surplus (5 yrs)	Pvt. Capital Acquired (5 yrs)	Increased Capital & Surplus (1944 Over 1939)	Increased Reserve For Contingencies (1944 over 1939)
Bell	\$7,410,000	\$1,670,000	\$9,293,000	\$3,600,000
Boeing	16,052,000	5,393,000	22,883,000	16,929,000
Consolidated-Vultee	33,377,000	000	32,644,000	19,000,000
Curtiss-Wright	40,516,000	000	35,365,000	32,831,000
Douglas	36,200,000	000	36,332,000	16,540,000
Lockheed - Vega	20,968,000	6,313,000	27,304,000	16,554,000
Martin	11,343,000	000	12,364,000	24,500,000
North American	17,683,000	000	17,683,000	14,185,000
Republic	7,615,000	000	5,517,000	3,917,000
United Aircraft	32,577,000	25,600,000	43,855,000	35,202,000
TOTAL	\$223,741,000	\$38,976,000	\$243,240,000	\$183,258,000

Table IV shows the comparative financial position of the ten major AAF aircraft manufacturers. We take for our prewar year 1940, rather than 1939, for various reasons. Here is what the consolidated balance sheet of the ten largest airplane companies looks like in 1940. You see here a net worth of 179 million in 1940. In 1944 it was increased to 581 million dollars. Working capital had increased from 68 to 394 million dollars, plus 74 million of postwar refunds of excess profits taxes.

Incidentally, this figure of 74 million, we know, is equal to ten percent of their excess profits taxes - therefore it is interesting to note that these ten largest companies in the 5 year period paid back to the Government in excess profits taxes 740 million dollars.

Another important item in war time is emergency facilities, - that is the fixed assets constructed for war purposes and reduced by the regular five-year amortization schedule - total value remaining for the 10 companies was 40 million dollars. The fixed assets dropped from 96 to 52 millions with varying depreciation rates and practically no additional plant investments. Net worth tripled during the war period - this includes the assumption that these general reserves are part of net worth. - I think we can assume that.

Now let us look at projections for the postwar 1946. These figures were derived after many hours of work. We took each individual company, projected its sales, and attempted to figure what its profit would be on those sales. Then we made adjustments as far as amortization facilities,

working capital, capital stock changes, and so forth. For each individual company we came up with a certain figure, which we put together, and that gave us this aggregate figure. That was the way we estimated in September 1945 what position the aircraft industry would be at the end of 1946.

TABLE IV
COMPARATIVE FINANCIAL POSITION
TEN LEADING AIRCRAFT MANUFACTURERS
(IN MILLIONS OF DOLLARS)

<u>BALANCE SHEET DATA</u>	Pre-War 1940 (Actual)	War Time 1944 (Actual)	Postwar 1946 (Estimated)
Cash & U. S. Gov'ts.	\$289	\$716	\$244
Acc'ts Rec. & Advances	53	988	250
Inventories	180	486	318
TOTAL CURRENT ASSETS	522	2190	812
TOTAL CURRENT LIABILITIES	454	1796	351
Net Working Capital	68	394	461
Postwar Refund E. P. T.	0	74	0
Investments	8	12	12
Emergency Facilities (Net)	6	40	0
Fixed Assets (Net)	96	52	77
Miscellaneous Assets	28	16	18
TOTAL NET ASSETS	206	588	568
NON-CURRENT LIABILITIES	27	7	3
CAPITAL EQUITY & RESERVES	179	581	565
Represented By:			
Preferred Stock	3	31	30
Common Stock	39	40	41
Capital Surplus	60	74	74
Earned Surplus	69	231	420
General Reserves	8	205	0
	<u>179</u>	<u>581</u>	<u>565</u>

Incidentally, I talk glibly about "1946" and "1944". Please realize that companies of the aircraft manufacturing industry have different fiscal years. - One company will start on August 1st, another on October 1st, and another at some other time. So when I use the words "1944" or "1946" I

mean the fiscal year, an arbitrary composite twelve-months period. It is the only way to put them together in a grand total for the theoretical year ending December 31st.

Now, in the postwar period the first thing that strikes our view is that the projected capital stock and reserve has decreased from 581 to 565 million dollars - that is mainly due to termination, readjustment, and reconversion expenses offset by an estimated nominal amount of earnings for the two-year period.

We assume that these amortized facilities will be all written off. That, of course, will give the companies a fairly large plant account written down to zero. The net effect of the writing down of amortization is to reduce net worth. But it raises working capital by a proportionate amount, because you get a credit on income taxes.

Certain summary figures are in order. Of course, we can't add them together, because, unfortunately, some figures are accumulated for the total industry rather than for the total existing as of the end of the war.

Summary Figures:

a. Government Investment Fixed Assets	-	\$3,823 million
b. Private Investment Fixed Assets	-	308 million
c. Advance Payments (cumulative)	-	3,776 million
d. Guaranteed Loans (cumulative)	-	5,089 million
e. 10 Companies		
(1) Additional Capital Stock	-	39 million
(2) Wartime Earnings After Dividends	-	391 million
f. Estimated Net Worth End of 1946 (10 Cos.)	-	565 million

In addition to these financial figures, I would like to point out important non-financial methods by which the aircraft industry was aided in meeting this tremendous war time load.

In the first place, there were brought in entire outside industries, the most important being the automobile industry. Secondly, the aircraft industry, like all the American industries, went to subcontracting for their major components through minor parts. Thirdly, these companies increased volume by intensified use of their own facilities - this included mass production techniques, longer working hours, multiple shift operations, and such factors as learning curve as the efficiency of the individual worker was increased, resulting in lower manhours per plane unit.

You have seen that the aircraft industry did make a lot of money in the war. They came out of it in a much better financial position than they thought they would. In fact, they are in a very good financial position. However, they have lots of problems ahead of them.

First, the aircraft manufactures have a definite financial responsibility in that they must continue to be the manufacturing aircraft arsenal of the AAF and probably also of the Navy.

Secondly, they have the great responsibility of keeping this country in the forefront in aeronautical research and development. That is one thing that Government arsenals of the Army and Navy could not do, for one or two men, no matter how able, could not humanly be responsible for all research and development. I can't impress upon you too much the necessity of having a competing aircraft industry with ten, fifteen, or twenty fairly good-sized companies, with good research staffs and trained management, together with necessary production facilities and experience.

Thirdly, the aircraft industry does have a financial responsibility to its own employees, to its stockholders, to the communities in which its plants are located, and also to various satellite industries.

The fourth responsibility financialwise of the aircraft industry is in the production of commercial planes. We look on our air transport industry as a growing force in our national and even international transportation system. This can come only from a strong and operating aircraft manufacturing industry and supported in large part by Government orders, which will make possible the designs of such planes as the Lockheed Constitution, Boeing Stratocruiser, or the Republic Rainbow; each of which had its military prototype.

In conclusion I would like to bring out the point that, whereas it is evident that the profits have been very high on their invested capital, such profits have been quite low upon their net sales. A very interesting case is Douglas Aircraft Company, an old-line commercial producer - in 1940 Douglas had sales of 60 million dollars, principally military export and domestic air line, and their profit was 11 million 100 thousand dollars - in 1944 sales to the Army and Navy exceeded one billion dollars, but their net profit after income taxes and before reserves was 10 million, 400 thousand dollars -- in other words, in this period of 1940 to 1944 their sales increased fifteen times and their aggregate net income actually decreased. So I think we got our planes at a pretty fair price after all, without bringing up such additional safeguards as redetermination, renegotiation, and the operation of the income and excess profit tax laws.

The second point is that the American aircraft industry as much as any other activity or force made possible the victory of the United Nations.

Thirdly, the industry has made and is making great contributions to the development of aeronautical research to keep our country in a leading position.

The fourth point is that a strong financial position of the aircraft industry is absolutely necessary if this country is to have an aircraft manufacturing industry which will serve as a nucleus for expansion in case of another emergency, which we hope won't come and which by your study here we are hoping to avoid, but the possibility of which must be realistically faced.

If there are any questions, I will be glad to answer them.

A STUDENT:

I am just curious about one item on Table IV. Did the fixed assets of 96 million diminish during the war years?

MAJOR BUTLER:

Yes, in dollar value carried on the respective balance sheets.

A STUDENT:

I was just wondering what the explanation is.

MAJOR BUTLER:

We have had a large decline in net book value due to depreciation reserves being uninvested in additional plant and to the 5 year or less amortization of emergency facilities. Of course, the actual physical plant of the individual companies is considerably larger and more modern than the prewar.

A STUDENT:

I wonder if from your financial survey of these companies you can tell us what the sales average of these companies will have to be in order to maintain the necessary industry in case of an emergency.

MAJOR BUTLER:

Of course, the companies have four types of sales: first, military sales, to the Army and Navy; second, commercial sales; third, export; and fourth private sales.

We figure right now that the aircraft industry itself with its present capital can finance without any outside aid about a billion dollars worth of business each year.

We consider that their total procurement is going to be considerably less than that. Military procurement will probably run this year, my guess would be, somewhere around 500 million. The commercial sales we estimate in this year, 1946, to be 150 million to 200 million. In other words, their sales will run anywhere from 500 million to one billion. I think the lower level will be nearer correct, whereas the Aircraft Coordinating Committee recommended normal peacetime sales at a low level of about one billion and an upper level of about one billion and a half.

A STUDENT:

Do you think some of these companies will go into other lines of work to help keep themselves in business?

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MAJOR BUTLER:

Some companies definitely are going to go into other lines of business. Consolidated-Vultee has gone into the truck-making business. Northrup is going to make toys. Martin has gone into various mechanical processes for preserving munitions and other machined goods. They are going to put plenty of their surplus funds into other businesses. I don't think any of the aircraft companies is really going to go by the board, as due to either other types of business or Government orders they will have enough to carry them along in the years ahead.

A STUDENT:

Are they going to make jet planes?

MAJOR BUTLER:

Yes. The jet engine field is a little peculiar in that the majority of them may be made by non-aircraft-manufacturing industry. At present most jets are made by General Electric, Westinghouse, and Allison. I have heard that Pratt & Whitney may go into making jets, and also Wright Aeronautical. But right now these figures include airframes, propellers, and reciprocating engines, but not jets. So we do know that, despite what happens to these companies, we are going to have the Allison subsidiary of General Motors as one of the leading producers of aircraft engines.

A STUDENT:

I don't see why the AAF should have to subsidize these aircraft companies when they have all these other companies that they can call on for help, as they did in this war.

MAJOR BUTLER:

In a period of from three to five years we could build up an aircraft industry like we did this time. But, as I said before, I think the answer to that is the fact that, despite the bringing in of General Motors, the bringing in of Ford, and the bringing in of other gigantic companies, together with thousands of subcontractors, despite all of that, nine out of every ten planes produced in the total war period came from these companies.

A STUDENT:

That is true of every other business that we have talked about; so it would also be true of the Army Air Forces.

MAJOR BUTLER:

The point is that when Ordnance wants tanks made, it doesn't have to go to its own arsenals, it doesn't have to go to General Motors. It can go to a number of the heavy machine industries - it can go to the

Baldwin Locomotive Company, or to International Harvester, or to Chrysler, in other words, industries which are in separate fields, whose peacetime production which will guarantee their existence. Ordnance could go to those companies for its production, whereas the aircraft manufacturers cannot go to General Motors - they will not start on airplanes - they just can't do it.

A STUDENT:

Why not?

MAJOR BUTLER:

In the first place they haven't got the specialized plant. - An aircraft plant requires various peculiar things, such as high bays and specialized machine tools. And, more than that, which is a very important thing, it requires aeronautical engineers, design, developmental, production. Then the dependence on skilled labor was shown particularly in the early part of the war. One of the biggest bottlenecks was labor - farm hands alone just can't produce planes - there must be thousands of skilled tool designers, machine operators, and supervisory personnel trained for aircraft production.

So my answer to your question is, it could be done over a period of years. But, looking at this thing realistically, you know that when the next emergency comes, we are not going to have a number of years to convert these other industries. We are going to have to get our aircraft from the aircraft industry that we have in peace time. We have to depend on them for the planes that we will get in the next twelve months.

A STUDENT:

Have you seen Senator Thomas' report?

MAJOR BUTLER:

I have seen Senator Thomas' report and I fail to concur.

CAPTAIN WORTEINGTON:

Thank you, Major Butler, for your very fine talk.

(6 August 1946 - - - - 200)P.